

Crosscutting Spectrometer Advancement: High Throughput, Multi-Octave Imaging Spectrometer (CC-Spec)

Completed Technology Project (2015 - 2018)



Project Introduction

Overarching objective: Research, design and develop a prototype of a new type of high-throughput, multi-octave imaging spectrometer that uses JPL unique capabilities.

This is a three year effort with the first year devoted to assessing and selecting the optimal approach to deliver a new high-throughput, multi-octave imaging spectrometer design architecture with laboratory demonstration. At this time the initial technical approach is to explore use an innovative tuned-prism based imaging spectrometer design. The concept is a Dyson imaging spectrometer with a tuned-prism as the dispersing element rather than a grating. This plausible, but very challenging architecture would be original.

The effort will work to incorporate NASA unique and advanced technology including cryocoolers and detector arrays. The multi-octave design will be compatible with the VSWIR 380 to 2500 nm range (~ 2.5 octaves) and the MLWIR range 2.5 to 15 microns (~ 2.5 octaves).

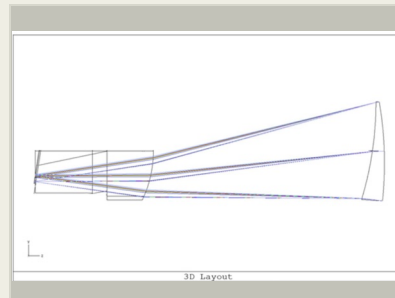
Anticipated Benefits

Possible future approach for HypsIRI or SLI.

Next generation remote measurement via spectroscopy for NASA missions: Earth, Mars, Planetary, Solar System and Astrophysics.

Remote measurement via spectroscopy for USGS, NOAA, DOD, etc.

Efficient and routine remote measurement and monitoring via spectroscopy.



Initial optical design for a high-throughput 3 octave VSWIR imaging spectrometer using a tuned prism dispersion element.

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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Center Independent Research & Development: JPL IRAD

Project Management

Program Manager:

Fred Y Hadaegh

Project Manager:

Fred Y Hadaegh

Principal Investigator:

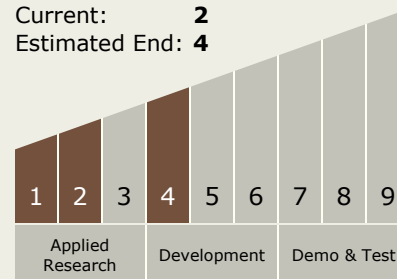
Robert O Green

Technology Maturity (TRL)

Start: 1

Current: 2

Estimated End: 4

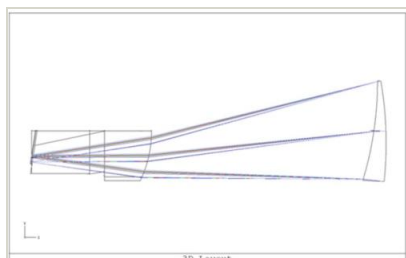


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Images



JPL_IRAD_Activities Project Image

Initial optical design for a high-throughput 3 octave VSWIR imaging spectrometer using a tuned prism dispersion element. (<https://techport.nasa.gov/image/32105>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.3 Optical Components

Target Destinations

Earth, Mars, Others Inside the Solar System

Supported Mission Type

Push